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ABSTRACT

Some basic starting points in Soviet psychological, educational, and psycholinguistic research are reviewed, with emphasis on the difference in perspective and terminology between Soviet and Western research. It was found that the concept of units and levels of analysis is evident in Soviet psycholinguistic research. The development of this and other methodological principles, explicated by Vygotsky in the 1920's is traced and their application to recent Soviet psycholinguistics is discussed. The emphasis is on the interrelationships between the various levels of consciousness, neurophysiological levels, and levels of language ability; the role of memory in speech production; and categories of linguistic utterance. Leontev's theory on the process of generation of utterances is reviewed and offered as a general model of human language ability. The salient points in Vygotsky's and Leontev's models are then applied to the study of meaning, word, and vocabulary in Soviet psycholinguistics. The focus is on language and thought, meaning and sense, the role of words in language activity, the relationship between grammar and lexis, the search for words in speech production, and types of vocabulary. (AMH)

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ON WORD, MEANING AND VOCABULARY IN THE CONTEXT OF GENERAL SOVIET THEORY OF PSYCHOLINGUISTICS

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A word is a microcosm of human consciousness. L. S. Vygotsky

1. Introduction

Anyone who has attempted to get acquainted with Soviet research in any discipline belonging to the humanities or social sciences cannot have escaped a feeling that there are clear differences between Soviet research and 'western" research. Thus Wertsch (1978) is undoubtedly correct in saying that "one should not assume that it is usually possible to tap the Soviet literature for results about a particular phenomenon that is already being investigated in the West" (p. viii). The reason for this dilemma is that the paradigm may be quite different and terms may have somewhat or quite different meanings from the ones used in western research. Thus, when reading Soviet research literature it is not unusual to come across passages where the author tries to explain in which way his or her use of terms differ from typical western usage of the terms.

Reading Soviet research with understanding presupposes that the reader is familiar with certain basic premises which are shared in the Soviet research community but which may be only partially shared in some western schools of thought and totally unknown in others. Before one quotes isolated passages from Soviet research, one should make sure that one knows the larger context. Such shared knowledge cannot simply be assumed to exist.

This paper tries to take into account the problem of only a partial overlap between the Soviet and western research paradigms. Thus, before a review of the results of empirical vocabulary studies can be sensibly made, there is a need for an extensive review of some general characteristics of Soviet research. This will be followed by a detailed exposition of the dominant psycholinguistic paradigm developed mainly by A. A. Leontev (1969, 1975). In spite of the fact that major aspects of this theory were formulated before 1970, it appears to be still considered the inevitable cornerstone of Soviet psycholinguistics.

Leontev belongs to the "Vygotskian School" of psychology and psycholinguistics. His father, A. N. Leontev, was a student and colleague of Vygotsky's and worked through several decades to develop some central concepts (e.g., consciousness, activity, personality) in Vygotsky's theory. Leontev's theory

focuses on the production of verbal utterances. While Leontev occasionally points out similarities between language production and perception, he also warns against any simple-minded assumptions that the two processes are roughly similar or that the same processes are only reversed.

2. Some General Characteristics of Soviet Research in Psychology and Education

One of the most immediate impressions one gets in starting to read Soviet research in psychology and education is that there is a distinct emphasis on theory building and theory-related research. There are constant references to classical authors and works. The most frequent references are to Soviet classics but it is by no means uncommon to come across references to leading western scholars, sometimes going back to the very beginnings of educational and psychological writing. One gets the impression that most researchers have a solid knowledge of the most outstanding work done in the field by previous generations. Earlier work is often critically discussed and its merits and weaknesses are defined. Recent advances in the field do not lead to the almost total neglect of earlier work, which seems to have become the norm in western research with the advent of a largely Chomsky-inspired research approach and ethos.

The emphasis on theory construction means that there is constant and systematic work going on to elucidate meaning and significance of central concepts. Thus, starting with Vygotsky, scholars like S. L. Rubinshteyn, N. A. Bernshteyn, A. N. Leontev, P. A. Galperin, D. B. Elkonin, A. P. Zaporozhets, L. V. Zankov, V. V. Davydov, A. D. Markova and others have systematically worked to develop theories of psychological functioning, human learning, and instruction. To give just one example, A. N. Leontev not very long ago (1975) published a book, which is considered an important milestone in Soviet Psychological and educational theory. It is a detailed study of the concepts of "activity", "consciousness" and "personality" and of their interrelationships. At about the same time Galperin (1976) published his introductory synthesis of some general principles of psychology. Both of these books have been translated into Finnish but to my knowledge, only Chapter 3 of Leontev's book has appeared in English in Soviet Psychology (Vol. XIII, No. 2, pp. 4-33).

A basic starting point of all Soviet educational and psychological research is the position that the child's mental development is socially and historically determined (a position explicated by Vygotsky in particular). Activity is the key concept since it is posited that there is a basic unity between the

mind and activity (a theory developed especially by Rubinshteyn and A. N. Leontev). On these premises Galperin has developed his stage-by-stage theory of the development of intellectual actions and types of learning. Davydov and Markova (1983) are the leading exponents of the theory of educational activity, in which they attempt to elucidate the structure of specifically educational activity and basic concepts such as assimilation, development, and instruction.

Galperin (1976, 1979) has worked out a fairly detailed system of various levels of activity and relates this to the general tasks of psychology. Working out this system was important, in Galperin's opinion, because he thinks that psychological research has made several unsuccessful or at least misguided attempts to define the object of psychology. Central concepts in Galperin's system are picture (image), orientating activity, psyche, subject, consciousness and personality. While it is not possible, and not the task of this paper, to present a detailed review of this system, a brief account may be useful as a starting point for the thesis (to be expanded later on) that in Soviet research there is a clear link between general psychological theory and psycholinguistic theory.

According to Galperin, "psyche" is the special characteristic of highly organized material. It constitutes a "jump" in the development of material. Psyche is not a special form of existence, but a characteristic (attribute), not primary but secondary. A "subject" is a special organism, which is a new complex structure and has the capability of guiding its activities. It possesses knowledge of its previous knowledge, obtains and processes information of its "internal status" and of the external world, structures the orientating and searching activity and finally implements activity. Such a "center" or "instance" is no longer an organism, but a "subject". Psyche does not act, only a subject does. Psyche is a special form of the subject's activity, his material activity on the level of a picture (image). A subject is always the subject of activity, not of just any activity, but of goal-directed activity, i.e., such activity that is regulated on the basis of a picture of a situation. "Personality" is a social-historical formation, largely possible due to the withering away of instinctive behavior. Personality presupposes consciousness but cannot be equated with it. Consciousness does not act, personality does, regulating its behavior on the basis of consciousness. One has to be a conscious, socially responsible subject in order to be a personality. At the level of

personality one does not limit oneself to individual experience but assimilates and uses the social experience of the group within which one is raised and lives.

The most important object of psychological research is the study of orientating activity by psche, subject and personality. Orientating activity begins automatically when automatic responding is not possible. In variable situations, which are characteristic of human life and the life of active animals living in complex organized environments, psychological orientation becomes necessary and the most important condition of the success of activity. Here is the objective necessity of psyche, the necessity of orientating on the basis of the subjective picture of a situation and of activity at the level of the picture ("ideal" not real activity).

Intellectual activity, but also needs, emotions, and will, are all different forms of orientating activity. They all are related to something in the future, something that needs to be done, produced.

Orientating activity has always the following components: its motivation, its pictures (also concepts), activities on the level of pictures (i.e., "ideal" activities), and different "tools" on which the possibility of ideal activity depends. All these components are interrelated and presuppose a certain organization, structure. That in turn determires the possibilities of orientation and, in the last instance, the effectiveness of behavior. The proper research object of psychology is the structure of orientating activity, its formation and characteristic features at each level of development and its functioning at each stage in the life of a subject.

Anticipating discussion in the section in which Leontev's psycholinguistic theory is presented, it is obvious that the concept of "picture" (image) is closely related to the notion of "program" and "programming" in psycholinguistics.

3. Some General Characteristics of Soviet Psycholinguistics

Wertsch (1978) mentions two factors that have had a definite impact on the orientation of Soviet psycholinguistics. The first factor that has had an impact is the wide array of languages spoken in the Soviet Union. The structure of languages studied has a definite impact on psycholinguistic theorizing in spite of some work on linguistic universals. Related to this aspect is the great cultural variety in the Soviet Union and the possibility it has given to relate language to cultural factors.

Another way that language has affected Soviet psycholinguistics has to do with Soviet language policies. Russian is the official language of government and education and thus Russian needs to be taught to the speakers of some 140 different language groups. Teaching Russian as a second language is an important task in the USSR and this has made it important for psycholinguists to relate their work to the practical needs of the educational system. Second-language teaching has had a much greater impact on Soviet psycholinguistics than the study of first-language acquisition and the teaching of the mother-tongue at school, which have largely occupied psycholinguists in the West. In addition to the two factors mentioned by Wertsch, some other characteristics can be mentioned.

A third factor has been the above-mentioned attempt to build a coherent general theory of psychological and educational phenomena. Psycholinguistics, like other special disciplines, builds on this general theory and develops the specific concepts that are needed due to the unique feature of the activity being studied. Language activity is considered to closely related to activity in general and thus it needs to take into account the work done in the general theory of activity. That this is the case will become very obvious in the later sections of this paper.

A fourth factor is that general psycholinguistic theory is greatly influenced by work done in neurolinguistics and language pathology. Vygotsky himself was personally interested in seeing how abnormal cases can shed light on more common cases. He encouraged his student A. R. Luria to take up neurolinguistic research. Luria is, in addition to Vygotsky, the most frequently quoted researcher in Soviet psycholinguistics.

A fifth factor that has had a clear impact on Soviet psycholinguistics is that psychology has had a more profound impact than linguistics, whereas, until very recently, linguistics (due to Chomsky's dominant role) has been predominant, especially in the United States, but also to a lesser extent in western European psycholinguistics. In fact, Leontev (1969, 1975) regrets that George Miller did not systematically pursue his work started with the publication of the "Plans and the Structure of Behavior" (1960) but instead led the way in the study of the "psychological reality" of Chomskyan linguistic concepts. Further, Leontev claims that Soviet linguists never uncritically accepted the transformational grammar model even as a model in linguistics. While acknowledging the merits of Chomsky and Miller as exponents of the model of language users'

knowledge of language, Leontev criticizes their model as the model of the processes of production and considers the early criticism of transformational psycholinguistics by J. B. Carroll and C. E. Osgood as relevant on several points. Especially interesting is to note the high regard Leontev shows for Osgood's general theory in spite of his critical remarks on some aspects of the theory and the regret he expresses that Osgood's theory has not been the object of a serious and thorough critical analysis, which it would deserve.

4. Levels and Units in Linguistic Activity

4.1. On the Concepts of Units and Levels

Vygotsky's early work (1934, 1962) on language and thought provided both a substantive and methodological basis for the emphasis on the units and levels of analysis that is clearly evident in Soviet psychological, educational and psycholinguistic research. Thus it is appropriate to start with a brief review of these two concepts. There is hardly any better way to do this than to try to find out what Vygotsky himself had to say about them.

According to Vygotsky, the study of thought and language is an area of psychology where it is important to understand interfunctional relationships. Vygotsky claimed that (at the time he was writing) separate psychological functions were studied but their interdependence and their organization in the structure of consciousness as a whole were seldom or never examined. The fact that the unity of consciousness and the interrelation of psychological functions were generally accepted and assumed did not lead to fruitful research, as might have been expected. This is mainly due to the tacit assumption that the relationships between functions were assumed to be invariant: perception is always connected with attention in the same way, similarly memory with perception, and thought with memory. It was considered possible to factor out such constants and study functions in isolation. Yet, according to Vygotsky, psychic development is crucially dependent on changes in the interfunctional structure of consciousness.

Vygotsky claimed that the problem was related to the choice of method: analysis of complex psychological wholes into elements rather than into units. The first method can be compared to the chemical analysis of water into hydrogen and oxygen, neither of which possesses the properties of the whole and each of which possesses properties not present in the whole. The problem with this type of analysis is that it shifts the issue to a level of greater generality

and thus does not provide an adequate basis for the study of multiform concrete relations between, e.g., language and thought that arise in the course of the development and functioning of verbal thought in its various aspects. A better method is to analyze psychological wholes into units. By unit Vygotsky means "a product of analysis, which, unlike elements, retains all the basic properties of the whole and which cannot be further divided without losing them" (p. 4).

In Vygotsky's opinion, word meaning, the internal aspect of the word, is the unit that meets the above requirements in the study of verbal thought. It is in word meaning that thought and language unite in verbal thought. Word meaning has a particular structure which changes at each stage of a person's mental development, and changes in this structure mean also changes in word meanings. The structure has to do with the way intellectual operations (e.g., degree of generalization) are related to the content of the operation.

The above brief review of Vygotsky's basic methodological concepts has shown that it is important to take into account consciousness in the study of psychological functions, to study the interrelationships between these functions and changes in these relationships, and to apply the method of analysis into units in such research.

In the rest of this chapter, an attempt will be made to show how the general methodological principles explicated by Vygotsky in the 1920's and the early 1930's have been applied in recent Soviet psycholinguistics. First, the interrelationships between the various levels of consciousness, neurophysiological levels and levels of language ability are discussed and their operative units are described. This is followed by a short description of the role of various types of memory in speech production. After that various categories of linguistic utterance are briefly reviewed. The paper then proceeds to discuss in greater detail questions related to word meaning and vocabulary. Originally the idea was to conclude the paper with a select review of some empirical Soviet studies of vocabulary but it turned out that the review of the theoretical foundations of such research required so much time and space that it expanded to a paper of its own. A totally separate paper on empirical studies on vocabulary is called for and it can build on this theoretical introduction.

4.2. Overview of Levels Related to Speech Production

According to Bernshteyn, referred to by Leontev (1975), the control of "movement" (Bewegung), and the control of all psychophysiological activity in general, is the result of the functioning of a complex organization consisting of several levels. Within this organization one of the levels always assumes the dominant role, i.e., becomes the dominant level. Which level assumes this dominant position is dependent on the content structure of the act. In other words, it depends on what requirements the structure of the concrete behavioral act sets on the action. According to Bernshteyn only the dominant level becomes consciously cognized, irrespective of the number of the levels involved. The degree of consciousness and the degree of voluntariness increase as we move from the bottom level to the top.

Table 1 presents in a summarized form three interrelated aspects of human functioning that are assumed by Leontev to play an important part in the production of utterances. These are language ability, psychophysiological processes and consciousness. It should not be assumed that there is any simple one-to-one linkage between the identical levels of the three categories. It is also worth pointing out at this point that it should not be assumed that the psycholinguistic units, which Leontev is interested in, have a one-to-one correlation with linguistic units.

Table 1. Levels of some central aspects related to linguistic activity (Leontev, 1969, 1975)

Levels of Language Ability		Neuro-physiological Levels		Levels of Consciousness	
Level of quant-sentences	C1	Level of connected speech	B1	Present (current) consciousness; focus of awareness	A1
Level of quant-words	C2	Word-object level	B2	Conscious control	A2
Structural level	C3	Level of operators	B3	Unconscious control	A3
Level of syllables	C4	Motor level	B4	Non-consciousness	A4

Bernshteyn suggests that the level of meaningful connected discourse is the highest in the hierarchy of speech activity. The next level is the level of the nomination of "objects" (word-object level), which corresponds to the

forms of activity with real objects in other types of activity. Bernshteyn does not distinguish other levels but Leontev (1975) suggests the level of operators and the motor level.

According to Leontev (1975) some of the psycholinguistic units are clearly related to the psychophysiological (neurological) levels. They appear as operative units when the corresponding levels are dominant.

4.3. Levels of Psychophysiological Functioning in Speech Production

The level of meaningful connected speech (discourse) corresponds to the unit in the psychophysiological organization of speech which Leontev regards as the program of the utterance. This program constitutes the operative unit in the first stage of utterance generation. Only the goal of the utterance is consciously cognized, not the means by which the program (and the subsequent links in the production of the utterance) is constructed.

Although the next level (the primary level of realization of the inner program) is called the level of word-objects, it has nothing to do with words as such. Rather, the unit is a propositional unit or a predicative pair or pairs (syntagm). At the level of operators the unit is the syntactic aspect of the syntagm.

The fourth level, the motor level, corresponds to the elements of the motor program as far as its operative units are concerned, i.e., in the first place syllables.

4.4. Units of Language Ability

The units of the level of language ability are considered by Leontev (1975) to be operative control units (units of "image" in the sense of Miller, Galanter and Pribram, 1960). They represent the stable components of the realization of the inner program. This realization can take place within a wide range of possibilities but it is based on certain stable elements - lexical, syntactical, etc. When an utterance is formed, we use words as "ready-made", global units. These "ready-made" stable units constitute the operative units at the level of language ability. They can also coincide with the operative units of the neurological level but in most cases they do not. Leontev remarks that this lack of coincidence reflects the complex nature of language, which keeps specialists in various branches of language study busy and often brings the researchers on automatic translation to the brink of despair.

Linguistic units are to be seen only as correlates of the operative units at the various levels of language ability but by no means as the operative units of the neurological levels. Among units of the latter level are all kinds of formulaic, fixed expressions, which are not constructed by selection of the possible means of expression but simply used as wholes. Luria and Tsvetkova (1969) describe how people with dynamic aphasia suffer from the disability of inner speech (or rather inner programming in Leontev's terminology) and thus cannot produce a whole sentence. The patients can name objects, repeat words and even whole sentences and they typically use verbal stereotypes ("how should I say it", "damn it", "I don't know," "this is terrible", "there are bears in the North -- which I shall tell you about", the last expression in response to a task to tell about the topic "The North" and the latter part of it after several prompts to tell more). When patients were given external supports (e.g., pieces of paper), they could produce sentences by touching the supports. The effect of the use of the supports was also seen in dramatic changes in EMG (electromyogram) ratings.

The level of quant-sentences corresponds to a number of linguistic units. Thus a sentence can be seen as a string of lexemes, a chain of morphemes, a phonological unit (a string of phonological units) or a string of syntagms.

How is the unit of this level of language ability related to consciousness? In typical circumstances, i.e., in spontaneous connected speaking, we are normally aware of the goal (the task) of the utterance and of its general sense (i.e., personal meaning) but not of the means that are used to realize the utterance. When we are required to bring these means to mind, we are not normally aware of individual words but of sentences or syntagms (e.g., thecatmeows, themilkspilledover). Only a further analysis leads to words and lexemes.

Leontev (1975) refers to Sapir's work in which he showed that speakers who did not have a linguist's knowledge of language never regarded synsemantic units (e.g., prepositions) as independent words. Luria's studies with aphasics have demonstrated the same phenomenon, e.g., ja idu v lec (I go to the forest) is regarded as three words: ja - idu - v lec. Such an aphasic can count words correctly when they are fully semantic words (content words) but starts making mistakes when form words (conjunctions, prepositions) are introduced. Young children have also been shown by Luria to do the same. For such persons, words like that are not the words of school grammar but quant-words, psycho-linguistic units of sense. With training, children - even certain aphasics - can be made to divide speech into words and syllables.

Thus we can conclude that the operative unit at the level of quant-sentences is the semantic aspect of the whole utterance.

The operative unit at the quant-word level is a unit of sense, which is a proposition consisting of predication pairs (syntagms): "round table", "my brother's wallet". Thus the typical unit at this level is the semantic aspect of the syntagm.

At the structural level the operative units are the syntactic constituents of the sentence (immediate constituents, phrases, functional classes, syntagms).

At the level of syllables the operative unit is obviously the syllable. According to Tsistovits and her coworkers (Kolezhnikov and Tsistovits, 1965), the basic elements of speech are the simplest articulatory complexes of type CV (consonant vowel). More complex combinations like CCV or CCCV are simply groups of the basic complex and they are organized so that the following complex begins before the preceding one is completed: thus psycholinguistically the mechanism for syllable building treats CCV as two syllables. Preschool children can usually divide words into syllables but they can have difficulties in dividing them into sounds (phonemes). Furthermore some children only distinguish the initial consonants of a syllable and in writing may leave out the vowels. On the other hand, even vowels may be distinguished if they are in an initial position and constitute a separate syllable.

Thus, consonants are not consonants as such but initials (i.e., linear parts of syllables) and syllables are to be seen as quants, i.e., operative psycholinguistic units. Syllable programming is organized rhythmically in the program of syntagms and the length of the syllable is dependent on the characteristics of the syntagm (e.g., place of word within syntagm, place of logical emphasis, etc).

4.5. Levels of Consciousness in Relation to the Tasks of Mother Tongue Teaching

Bernshteyn (1966) has developed a physiologically oriented theory of activity. A crucial notion in his theory is that the basic principle in the organization of any activity is "appropriateness". An act of voluntary activity is directed towards the attainment of a given goal, which lies in the future. The goal determines the choice of an act and it also determines the consideration to the circumstances in which the act takes place. There are control and correction mechanisms, which function during the act and make it possible to compare the result of action with the "model of the future"

and modify activity if needed. Activity consists of several levels of which only the dominant level is consciously cognized. It is obvious that Bernshteyn's theory has similarities with the theory of the plans and the structure of behavior by Miller, Galanter and Pribram (1960).

Normally only the speech intention is consciously held, the goal that the speaker wants to attain. A young child then realizes the goal by an essentially unconscious set of operations. When the child goes to school and has to learn to read and write, these operations become the object of central cognized awareness and may then, with practice, "sink" to the level of conscious or unconscious control. Thus the task of mother tongue teaching and of grammar teaching, according to Leontev, is to enhance students' voluntary control of language: to make them capable of operating on language and not only with language. Mother tongue teaching correlates objective facts of language with the already existing abilities of children, makes them objective and thereby makes their development possible. Thus, depending on the topic and level of mother tongue instruction, the object of conscious analysis may be any linguistic unit: letter, morpheme, word, sentence, etc.

Extrapolating from Leontev's theory, it might be suggested that once some linguistic phenomenon has been made consciously aware and practiced, it may be allowed to sink to the level of conscious control. Thus units of a person's linguistic repertoire may be assumed to exhibit a certain kind of see-saw pattern at various levels of consciousness. The task of review sessions is to raise topics to the level of central awareness and thus reinforce the likelihood of their conscious control. The recall of prerequisite knowledge before teaching a new topic is another instance of the pedagogical application of the theory of the levels of consciousness.

Any aspect of language activity can be made the object of conscious awareness and control. A proofreader pays close attention to individual letters. A person may pay special attention to pronunciation, for instance, if he or she wants to avoid dialectal patterns of pronunciation.

Teaching second languages is perhaps the best example of a case where any aspect of language production can be made the object of conscious awareness and control with slow progress towards unconscious control.

5. Categories of Linguistic Utterances

Leontev (1977) criticizes psycholinguistic research in the West, especially in the United States, for losing its sense of proportion and for lack of a clear idea of its unique tasks. Thus psycholinguistics became dominated by linguistics (Chomskyan transformational grammar) and started analyzing the psychological reality of linguistic concepts. Leontev considers this unfortunate and claims that psycholinguistics ought to be more strongly anchored in psychology.

> No matter how we rework and refine a linguistic model ..., it will never reflect psychological or psycholinguistic reality for the simple reason that speech activity, whether in the native or a foreign language, is always a system of meaningful operations, a system of qualitatively distinct elementary acts, whereas even a model that focuses on language processes (such as a transformational model) is always a system of transitions from one qualitative state to another. A model of language involves units and operations on those units; a model of speech activity involves unitary operations or operational units, certain prerequisites for their performance, and certain functionally, but not formally, definable intermediate and terminal states. The task of the speaker, for instance, is not to construct a particular utterance (in the sense of formal structure or even of meaning), but to solve a particular nonverbal task. The form of the utterance, therefore, is infinitely variable, and one can speak here of the invariability of its form or content only in a conditional sense. Hence the idea of a "model for the speaker" and the "model for the listener" as linguistic models is an obvious misconception ... No linguistic model whatever can adequately interpret these real mental processes carried out by the speaker or the listener. (Leontev, 1973, 70)

Thus, we should not expect there to be any simple and perfect overlap between the units of linguistic analysis and description and the operational units of language activity. Furthermore, Leontev (1969) points out that speech production is different in different types of speech. A classification of types of utterances developed by Leontev (1975) will be briefly summarized below.

Circumstances influence what a person says. How he says it can vary considerably and according to Leontev (1975) depends on (a) what he says, (b) the functional directedness of speech, context, etc., (c) the specific operational structure of the speech act.

A psycholinguistically relevant classification of speech acts is built on three criteria. The first have to do with the inner organization of human language capacity ("psychophysiological" criteria). The second criterion is

related to the fundamental structure of activity and with the sociopsychological functions of language ("psychological" criteria). The third group includes criteria linked with the characteristic features of the linguistic realization of the utterance (Leontev, 1973).

I. "Physiological" criteria

1. The orientation of the physiological level of organization of language activity (in Bernshteyn's sense): which is the dominant level? Using this criterion the following types of speech can be distinguished:
   a. communicative speech; speech in social interaction
   b. nominative speech; speech that is aimed at designating things in reality
   c. echolalic (or imitative) speech; speech in which a person simply repeats what somebody else has said without being consciously aware of its content
   d. choral speech; speech in which several persons speak simultaneously following some common model

   Type a is the most typical in speaking in one's native language but b through d are quite common during the process of learning to master a foreign language (c and d are particularly typical in learning the phonetic system).

2. Degree of constructiveness vs. stochastiveness

   Is speech generated as a unique string of interrelated elements or is it constructed (i.e., has an inner scheme). This is related to the presence or absence of inner programming. Using this criterion the following types of speech can be distinguished:
   a. active speech (Skinnerian "mands")
   b. reactive speech (speech that occurs especially in dialogues)
   c. different forms of speech variants, which are not actually speech, such as Skinner's transcription, intraverbal behavior (writing from dictation, translating from one language to another).

3. Degree of consciousness

   Related to the notions of Bernshteyn and A. N. Leontev, the following types of speech can be distinguished:
   a. unconscious speech, e.g., typically children before they have received institutionalized instruction in school
   b. controlled speech; speech that shows a controlled choice, through

voluntary action, of the units of speech. This comes after language has been made an object of conscious analysis and the mastery of various potential units has "sunk" from the level of present (focal) consciousness to the level of conscious control.

2. conscious speech; speech in which any individual elements of the utterance can become the object of central, cognized awareness. Usually, in spontaneous communicative speech the operative unit is the semantic aspect of the whole utterance.

II. "Psychological" criteria

1. Place of the utterance in the system of activity as a whole ("intellectual activity", possibly accompanying another form of activity)
Using this criterion the following types of speech can be distinguished:
   a. planning speech; speech that actually accompanies the planning of an activity (planning can, of course, also be done without speaking)
   b. speech as activity, i.e., the speech act in the normal sense
   c. analytic speech; speech that accompanies the stage when the results of an activity is compared with the plan

2. Motivation for the utterance
Using this criterion the following types of speech can be distinguished:
   a. spontaneous speech; the motives of this kind of speech come from "within" (cf. Skinner's "mand")
   b. situationally bound speech; speech that is considerably influenced by the concrete situation (elsewhere Leontev remarks that children's early speech is situational and only understandable within the concrete situation, before it develops into contextual speech, see c below)
   c. contextual speech; speech that is part of a larger conversation with a unified content and within which an utterance is largely determined by the preceding utterances
   d. unmotivated speech; speech that consists of assertions, negatives, etc. (cf. Skinner's autoclitics)

3. Functional orientation of the utterance
Depending on the functional directedness of an utterance it can be classified into one of the following categories:
   a. request or command
   b. question
   c. greeting

d. exclamation (cf. Luria's affective speaking)
e. autoclitic
f. constative (statement)

III. "Linguistic" criteria

1. Sententiality

Depending on whether or not an utterance is expanded into a sentence, the following types can be distinguished:

a. non-sentential (greetings, "attention getters", exclamations, short answers)
b. sentential
c. supersentential (a sequence of sentences)
d. suprasentential (part of a sentence)

2. Logical-psychological type

Following Luria, the following types are distinguished:

a. communication of events (e.g., The dog is barking)
b. communication of relationships (e.g., Socrates is a man)

3. Relation to a particular speaker

Using this criterion, the following types of utterances can be distinguished:

a. beginning utterances (cf. Fries's situation utterances)
b. sequence utterances ("elaboration" utterances)
c. response utterances

Leontev (1975) refers to Cholodovitz who in his typology of language use distinguished the following categories: (1) medium of expression (sound, writing, gestures), (2) presence or absence of a partner, (3) orientation of the speech act in one or two directions, (4) presence of one or more addressees (individual or mass communication), (5) contact or distance during the speech act.

Leontev points out that there obviously is overlap between various criteria. He suggests that it is not reasonable to expect that forms of utterance are socially so clearly fixed that they only differ from each other in terms of a single characteristic. Thus it is not surprising that the most typical and widely used forms of linguistic communication exhibit most of the characteristics mentioned in the above. For example, ordinary spontaneous speaking is typically characterized by I,1,a; I,2,a; I,3,b; II,1,b; II,2,a or b; III,3,a; etc. Writing, another type of language production, differs from speech production. Vygotsky and Leontev agree that it is the most voluntary form of language production and mainly due to its monologue nature requires the most deliberate construction of meaning.

6. Memory in Speech Production

According to Leontev (1975), there are several types of memory involved in the process of speech production.

a. Situational memory, which is closely related to a conditional response to a certain constellation of external factors. It might not even be called a memory in an ordinary sense.

b. Short-term memory for the time needed to realize obligatory grammatical categories of a planned utterance (a concept derived from Yngve, 1964).

c. Storage and retrieval of the plan (program) of an utterance. This is stored in a form of objective-schematic code. This kind of memory is immediate (direct, not mediated) memory.

d. Storage and retrieval of the content of the utterance. This is an operative type of memory, which has certain structuring characteristics. Content is stored still independently of words: it is the ordering of "sense" (personally colored "meanings") from thought to thought (Vygotsky, 1962). This memory is related to the grammatical program (plan) of the utterance. It is an operative memory.

e. Storage and retrieval of the form of the utterance, or rather learning by heart and retrieving it by rote. The memory of form is related to the kinetic program, the motor program, and it is an operative memory.

f. Storage and retrieval of grammatical structures. This is a long-term memory.

g. Storage and retrieval of words. This is a long-term (permanent) memory.

h. Storage and retrieval of formulaic expressions. This is a long-term memory.

i. Storage and retrieval of sound sequences. This is a long-term memory.

Memories f through i are also called "mother-tongue memory" by Leontev since they are directly concerned with the real units of the language that is being used to realize the plan of the utterance.

The immediate memory is dependent on the general psychophysiological capacity of the mechanism, irrespective of the task of the activity. The operative memory is, on the other hand, subordinated to the objectives of the concrete task. Thus its "short-termedness" is relative. The operative memory is the memory of programs (plans). The programs, in turn, are not to be seen as given but as processes, processes of programming.

1. What is stored or retrieved? These can be: (1) the external circumstances of the utterance (a); (2) the content of the utterance (c,d); (3) the form of the utterance (e,h); (4) the linguistic components of the utterance (f,g,i); (5) the linear components of the utterance (b).
2. How does storage take place? There are these alternatives: (1) "automatic", immediate (direct) memory (a,b); (2) voluntary memory (c,d,e); (3) "obligatory" memory (f,g,h,i), "obligatory" since a person is a human being and lives in a given human society.
3. How does retrieval take place? The following variants are possible: (1) completely automatic retrieval, which normally does not rise to the level of consciousness (a,b); (2) retrieval that takes place automatically but which can normally become conscious (f,g,h,i); (3) half or totally conscious retrieval (c,d,e).
4. How long does storage take place? There are the following possibilities: (1) memory for the span of one utterance (b); (2) memory for a group of utterances (c,d,e); (3) "permanent" memory (a,f,g,h,i).

Leontev (1975) points out that "memory for words" (word memory) should not be equated with "verbal memory", in spite of the fact that this sometimes happens in experimental literature. "Verbal memory" is usually a voluntary and indirect memory. "Word memory" is immediate (direct) and non-voluntary (obligatory in the sense explained in the above). Verbal memory is usually characterized by voluntary, often conscious and usually mediated retrieval. Word memory, by contrast, is characterized by non-voluntary, often not conscious and usually immediate (direct) retrieval. Verbal memory is time-bound, word memory is "eternal".

7. Summary of Leontev's Model of Speech Production

After discussing various aspects of the rather complex and comprehensive theory of speech production developed by Leontev in the late 1960's, it is probably useful to try to summarize the main points of the theory before going over to discuss problems related to meaning and vocabulary.

1. Teleological factors (goal factors) play a definite role in the organization of the system of speech activity and in speech acts. Goal factors appear in the structure of a speech act as a "task for action", which is defined by means of a program for that action.

2. Probability factors and probability prognosis are part of the organization of the system of speech acts. In accordance with Bernshteyn's "model of the future" (which is related to the notion of "Image of Results" by Miller, Galanter and Pribram, 1960), it is assumed that in addition to some other factors, the choice of an utterance is associated with the probability experiences of the organism. Out of several possible forms of utterance the one is selected which is the most likely to lead to the attainment of the goal. Soviet studies have shown the effect of the disturbance of the probability mechanism in schizophrenics and in aphasics who suffer from damage to the frontal lobe.

3. It is assumed that "inner programming" precedes the external realization of an utterance. It is not to be equated with "inner speech", which has another functional orientation and is typically related to the planning of non-verbal activity. Inner programming is the underlying base for the actual structuring of a sentence. However, inner programming contains only the correlates of the basic components of the utterance and these are usually coded in an "objective-schematic" code. The external aspect of the inner programming units is variable but the content aspect is fixed and constant. It consists of a string of units of sense (personally colored "meanings", not objective "dictionary" meanings), which are strung together in an agglutinative manner. The structure of inner programming shows ellipsis. Its structure is probably similar to the mimetic speech of the deaf, the spontaneous manual speech (facial expressions) and shows typically the following order: Subject - Attribute - Object - Attribute - Predicate - Adverbial (circumstantial modifier), e.g., Cat black ear scratched lazily. It is assumed that this order reflects some real characteristics of the process of generating an utterance. The same order appears to be the decreasing order in which a given word class can serve as an effective prompt for recalling the whole utterance.

4. Drawing on Luria's studies with aphasics, it is assumed that inner programming can be characterized by a "vector model". The parts of the inner program are components like individual words in a telegram style text. The words are associated with a propositional (predicational) force. This kind of "language" consists mainly of noun phrases with verbs as optional elements (S↑ O↑). The external speech of some type of aphasics may come close to the form of inner programming, e.g., So ... front ... and ... attack ... and ... explosion ... and ... nothing ... operation ... language ... language.

5. It is assumed that the program of an utterance is stored in a "program memory". It is further assumed that the content of the preceding sentence or sentences is preserved in the form of the program code, not in the form of fully worked out external language but only as a "meaning skeleton". The motor plan (motor program) uses another type of memory (structure memory).

6. Assuming the functional orientation of memory, the memory for mother tongue does not consist of two categories (STM, LTM) as is often assumed but of three types of memories: (a) immediate memory (memory for the whole utterance), (b) operative memory (memory during the relevant speech act), and (c) permanent memory (memory for the elements of the linguistic code, which is to be understood as a process, not as "cells" or as "objects"). The three memories follow each other and are only potentially separable parts of one and the same process.

7. The operative units in the immediate memory are assumed to be close to what Yngve called "obligatory categories". The immediate memory only registers the presence of the elements and not their interrelationships. Retrieval is based on "relevant criteria", which are grammatical features and the associative features of words.

8. As regards the above-mentioned features, it is assumed that the search for words in the lexicon during the process of speech production is based on the simultaneous scanning of two sets of features: the acoustic-articulatory and the semantic-associative. In the process of such a search the probability character of the search changes at each point when those words are set aside that possess the scanned features. In special cases it is possible to search according to only one feature or employ heuristic search strategies.

9. Related to the above, it is assumed that a word is contained in the lexicon not as a static "object" but really in the form of the search itself, or more accurately, in the form of the orientation point of such a search.

10. During the grammatical and lexical realization of the inner program there operates a "picture screen" mechanism roughly in the form formulated by Worth (1958). The grammatical structure of an utterance is predicted in advance and compared with the program. If the two agree, the process proceeds to the final selection of elements on the basis of different criteria. If there is lack of agreement, there follows either a transformation of the predicted structure and its incorporation into the program or a reappraisal of the rules from the

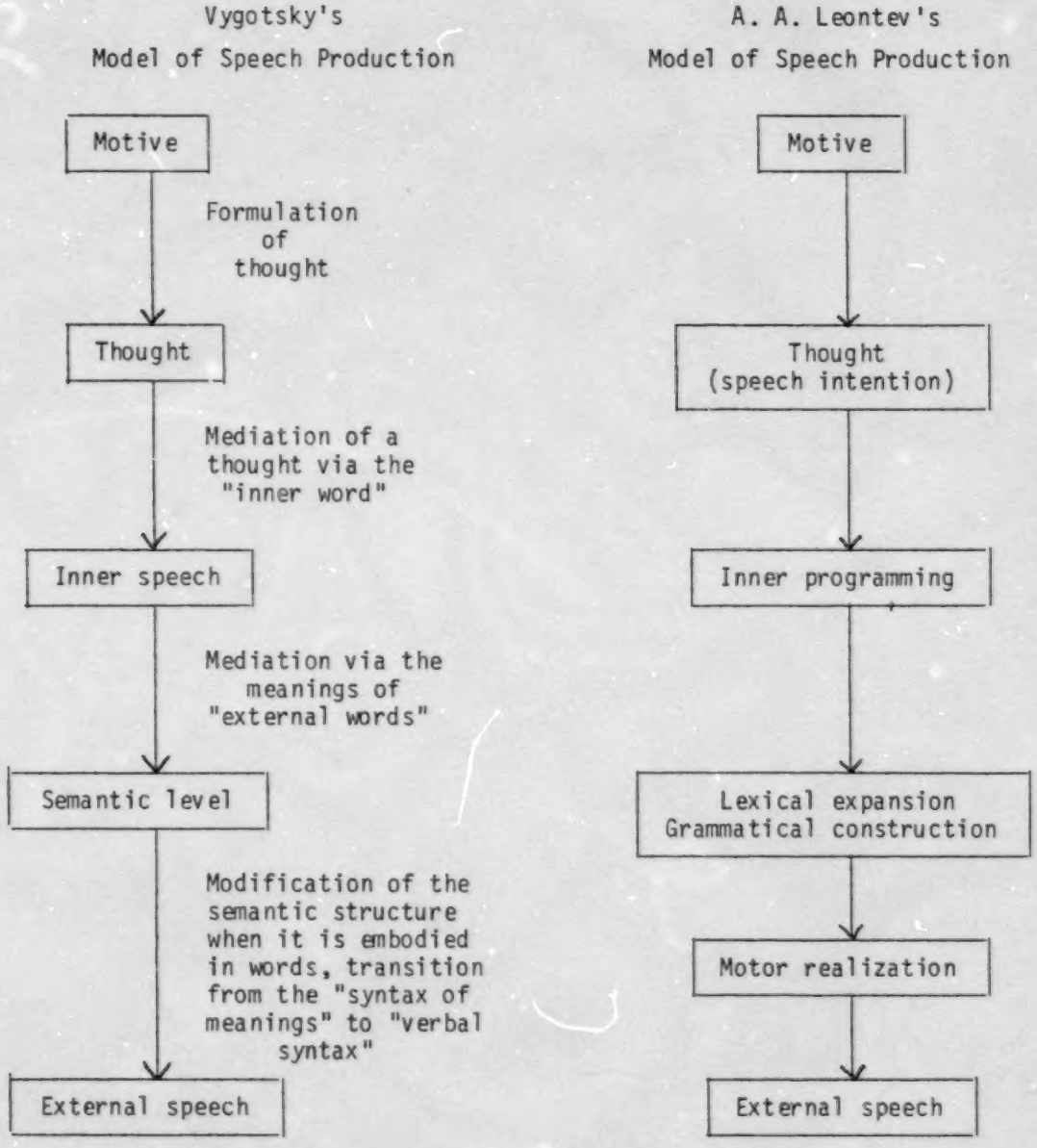

Figure 1. Vygotsky's and Leontev's Models of Speech Production (Akhutina, 1978).

transition from program to its realization. There are always several possible ways of realizing the inner program of an utterance and a speech act and this often takes place according to heuristic principles.

According to Leontev (1975) the above hypotheses are closely connected with each other and should be seen as an attempt to model the process of the generation of utterances. Together they describe the objective and interrelated elements of language ability. It should also be noted that the model is not to be seen as a narrowly defined single model but rather as a class of models, in other words, the details of the model can be realized in ways which differ from what has been said in the above but they still fall within the general framework of the model. Leontev's model is to be regarded as a general model of human language ability.

8. On Meaning, Word and Vocabulary in Soviet Psycholinguistics

8.1. Language and Thought

In Soviet psycholinguistics, two terms "meaning" and "sense" are frequently used and a clear distinction is made between them. The distinction originates with Vygotsky, or at least he is usually regarded as the leading exponent on the role of meaning in human activity. Thus it is appropriate to briefly examine Vygotsky's theory of the connection between sense and meaning and between thought and word. We will begin with the first two concepts.

According to Vygotsky (1962), thought and word are not connected by a primary bond. A connection originates, changes and grows in the course of the evolution of thinking and speech. The connection between thought and word is formed by the basic unit of verbal thought, word meaning. In Vygotsky's own words:

> The meaning of a word represents such a close amalgam of thought and language that it is hard to tell whether it is a phenomenon of speech or a phenomenon of thought. A word without meaning is an empty sound; meaning, therefore, is a criterion of "word", its indispensable component. It would seem then, that it may be regarded as a phenomenon of speech. But from the point of view of psychology, the meaning of every word is a generalization or a concept. And since generalizations and concepts are undeniably acts of thought, we may regard meaning as a phenomenon of thinking. It does not follow, however, that meaning formally belongs in two different spheres of psychic life. Word meaning is a phenomenon of thought only in so far as thought is embodied in speech, and of speech only in so far as speech is connected with thought and illumined by it. It is a phenomenon of verbal thought, or meaningful speech - a union of word and thought. (p. 120)

Direct communication between minds is impossible, not only physically but psychologically. Communication can be achieved only in a roundabout way. Thought must pass first through meanings and then through words (p. 150). Thought, unlike speech, does not consist of separate units. A speaker often takes several minutes to disclose one thought. In his mind the whole thought is present at once, but in speech it has to be developed successively. A thought may be compared to a cloud shedding a shower of words. Precisely because thought does not have its automatic counterpart in words, the transition from thought to word leads through meaning. In our speech, there is always the hidden thought, the subtext. Because a direct transition from thought to word is impossible, there have always been laments about the inexpressibility of thought (e.g., Einstein).

This connection between thought and word is not a thing but a process. It is continual movement from thought to word and from word to thought. In mastering the external speech (phonetic aspect), the child starts with one word. Semantically this one word is, however, a whole sentence, an undifferentiated whole, which can only find expression in an undifferentiated form (i.e., single word). Thus the external and semantic aspects of speech develop in opposite directions: from the particular to the whole (from word to sentence) and from the whole to the particular (from sentence to word). The structure of speech does not simply reflect the structure of thought. That is the reason why, in Vygotsky's words, "words cannot be put on by thought like a ready-made garment." Thought undergoes many changes as it is turned into speech. It does not simply find an expression in speech in any straightforward manner. It finds its reality and form in speech. Thus, paradoxically, the semantic and the phonetic developmental processes are essentially one, precisely because of their reverse directions.

Vygotsky (1962) states that there is the independent grammar of thought (the syntax of word meanings) behind words. Every utterance is a process. It does not reflect a rigid and constant correspondence between sound and meaning. Verbal utterances cannot emerge ready-made but must develop gradually (cf. Leontev below).

8.2. Meaning and Sense

In regard to meaning and sense, Vygotsky - drawing on Paulhan - claims that sense is predominant over meaning. Sense is a dynamic, fluid, complex whole, which has several zones of unequal stability. Meaning is a narrower concept: it is only the most stable and precise zone of sense. A word derives its sense from the sentence, which gets its sense from the paragraph, the paragraph from the book, and, especially in literature, the book from all the works of the author. Meaning, on the other hand, remains stable throughout the changes of sense. "The dictionary meaning of a word is no more than a stone in the edifice of sense, no more than a potentiality that finds diversified realization in speech" (p. 146). Thus a word in a context means both more and less than the same word in isolation. It means more because it acquires new content, but it also means less because its meaning is limited and narrowed down by the context.

According to Vygotsky (1962), to the young child the word is an intergral part of the object it denotes, a conception which seems to be characteristic of all primitive linguistic consciousness. The fusion between the semantic and vocal aspects of speech begins to loosen when a child grows older and the distance between them increases gradually. In early childhood, in functional terms, there exists only the nominative function (naming) and, in semantic terms, there exists only the objective reference of a given word. Later on, the significative function (independent of naming, nomination) and meaning (independent of reference) develop. A child's usage can coincide with that of the adults in its objective reference but with meaning only when the above development has been completed.

In inner speech, the predominance of sense over meaning, of sentence over word, and of context over sentence is the rule. Inner speech is a single word so saturated with sense that many words are needed to explain it in external speech. Thus inner speech is speech almost without words. In Vygotsky's own phrasing "words die" as they bring forth thought.

8.3. On the Role of Word in Language Activity

Referring back to the importance that Soviet research gives to levels of analysis and units of analysis, it is of interest to try to elucidate the role that the word plays in Soviet psycholinguistic theory in general and in the theory of Leontev in particular. Unfortunately it is not quite easy to give

a clear account of that because this is never stated in an unambiguous and definitive way. Thus the best that can be done is to try to piece together views that are scattered in various places in the most important references.

It would appear that words or rather quant-words are considered to be the units in the nomination of objects in inner programming. The program consists mostly of nouns (subjects and objects) which have some kind of predicational force attached to them (Luria's vector model S↑ O↑), so that in expanded form they resemble propositional units (syntagms). It also appears that the word is considered the unit of prognosis at the level of motor programming of an utterance.

In usual cases, before a child learns to read, he only has quant-syllables (which, as mentioned earlier, may not coincide with "real" syllables, because vowels may be ignored and attention paid only to "initials") and quant-words (i.e., syntagms in extended verbal expression) as control units in speech production. Leontev cites earlier research with children at the beginning of school age and with certain types of aphasics which has shown that an utterance is frequently considered to consist of two parts, which are often taken to be words: "The bird that we frightened - flew to the top of a high tree"; "The apples - are in the bag". This is related to the notion of old and new information, theme and rheme. At school, the child comes across new control units, syntagm and word, which are made the object of conscious analysis.

8.4. On the Relationship Between Grammar and Lexis

The semantic and grammatical structure of the context are independent factors. According to Leontev (1975), the choice of a grammatical category is much less dependent on the influence of the context than the choice of a concrete word.

Leontev (1973) suggests that the problem of filling in the syntactic structure with lexical elements first arises during the stage when the inner program is being realized. At the early stage of this process a person operates only with some fundamental elements of the utterance, not with its semantic details. "Groping attempts" are made for the semantic features of the words but not yet for their acoustic-articulatory features. Filling in the last elements begins first when a speaker has arrived at a definite construction. Leontev (1975) suggests that each word in the lexicon must be associated from the very beginning with both syntactic and semantic markers. It then becomes

an important task for psycholinguistics to elucidate the possible (and necessary) ways for the choice of a word out of the lexicon at the production of an utterance. Such a task, i.e., to create a kind of typology in the semantic space, is not as utopian as some people have suggested. It is not doubted that there are regularities in the search of the semantic space since we would otherwise have to assume that there is a complete sorting through of the lexicon, which is an absurd idea. Thus the question is what kind of criteria are used in such a search. It seems obvious that the phonetic character of the word and its probability are relevant characteristics in such a search.

8.5. Search for Words in Speech Production

Leontev (1975) assumes that words in the permanent memory are ascribed a certain quantitative probability characteristic and when that threshold value is exceeded a word is recognized in speech production as one that has appeared before.

In most cases the semantic features are more important in the search for words. It depends, however, on the situation whether the word is searched according to semantic or phonetic criteria. Children, people under the influence of drugs, schizophrenics, people using poetic language, etc., can search for words in accordance with the acoustic principle.

The semantic aspect of the production of utterances is assumed to be associative in nature. Thus the system of semantic word features is to be found in the area of associations and it cannot be the "semantic meaning components" of the lexicon at the abstract-logical level.

According to Leontev (1975), as far as speech production is concerned, the word should not be taken to be something stored in the brain as an "engram". The word is a process, its search. When we cannot find a word, our search is not completed. What is at the end of the search if not an "engram"? According to Leontev, probably simply a signal that the search is complete, as sense of "resonance".

How can a word be searched? There are at least the following possibilities (Leontev, 1975):

1. One path of phonetic search and several paths of semantic search. In this case we have something which is usually called homonymy or polysemy. From a contextual point of view these two concepts are not distinguishable.
2. One path of semantic search and several paths of phonetic search. In this case we are dealing with synonymy, not "absolute" (lexical) synonymy

(which strictly speaking does not exist) but so-called contextual synonymy.

3. Several paths of both semantic and phonetic search. Although there in this case are several paths of search, there must still be something invariant in the search since otherwise the lexicon would be totally unorganized. Such invariants are "road signs" and constitute the objective characteristics of the search.

In the case of most words, the semantic and phonetic search proceed independently of each other. Leontev (1975) suggests that these two can be synchronized in "phonetic symbolism". This concept is sometimes dismissed by linguists but Leontev claims that it is a concept of psycholinguistic relevance. Certain sounds can be associated with certain impressions and "forces".

In order to be able to find a word (and in order to be able to encode it once a correct memory location has been arrived at), it is necessary (a) to have mastered the phonological system of the language (the acoustic-articulatory features of the phonemes), (b) to have mastered the system of semantic features of words, and (c) possess some latent, intuitive knowledge of the statistical-probabilistic characteristics of all these features (i.e., have a sense of which features are more probable and occur more often in a given context and situation and which features are less probable). Leontev (1973) suggests that the only way to come to possess (largely) intuitive knowledge of the statistical-probabilistic features of words is repeated exposure and practice. As a person listens to or reads linguistic material, he unconsciously processes it statistically and "assigns" a particular probabilistic parameter to the units stored in his memory.

8.6. Types of Vocabulary

Leontev (1973, 1975) states that we have to make a distinction between a person's active, passive, reproductive and productive vocabulary. "Passive" vocabulary consists of the words that a person can match with their referents. This matching procedure does not, in principle, require the use of any features - any recognition strategy will do. "Reproductive" vocabulary also differs from "productive" (active) vocabulary psychologically in a quite clear way: reproduction does not require the use of the semantic and statistical-probabilistic features of words. It differs from passive vocabulary in that it does require the acoustic-articulatory features. Active productive vocabulary, in turn, is composed of those words that a person can "put together" on his own from the tree sets of features - referred to in the above - that he knows.

9. Conclusion

This paper, which was originally to be mainly a review of some selected Soviet research on vocabulary learning, has tried to explore some basic starting points in Soviet psychological, educational and especially psycholinguistic research. This shift in focus appeared both reasonable and necessary, since it soon became evident that empirical research can be sensibly interpreted only if it related to the underlying dominant Soviet research paradigm. The review of this paradigm turned out to be a major task requiring quite a lot of reading and a real effort in first trying to understand and then summarize the relevant literature. By way of compensation, this task proved to be extremely interesting and definitely very instructive as well.

There are at least two reasons which explain the reviewer's dilemma. First, Soviet psycholinguistic research is solidly based on both psychological and linguistic foundations and it also incorporates findings from neurophysiology and neurolinguistics. Thus the content of a theory like Leontev's is very comprehensive. The theory is also presented in a closely argued and reasoned manner with a lot of detail. It is hard to do justice to such a tightly presented theory in a few pages without serious oversimplifications. A similarly comprehensive psycholinguistic theory has been presented by Charles Osgood. It is perhaps not surprising that Osgood's theory is highly regarded by Leontev as a serious attempt to build a psycholinguistic theory which is linked with a general theory of behavior. It is undoubtedly this characteristic which makes Leontev state that on many counts Osgood's early criticism of Chomsky and Miller makes psycholinguistic sense and thus supports some of the views in Osgood's own theory.

Another reason for the difficulty for a reviewer is that terms sometimes have slightly and sometimes quite different meanings from the ones attached to them in western research. Therefore, perhaps a reviewer ought to annotate the review with a lot of footnotes, which is cumbersome. The more familiar one becomes with the general assumptions of the Soviet research paradigm, the more obvious it becomes that one is liable to misinterpret the meanings of texts if one is not aware of these numerous unstated assumptions and divergent meanings of terms.

Let us now recapitulate some of the salient points made in the preceding review of Soviet psycholinguistic theory and try to draw some tentative conclusions from it.

One of the first points that captures the attention of one who is trained in a predominantly western research paradigm in linguistics and psycholinguistics is the fact that language activity is considered to be closely related to activity in general. Thus most of the characteristics of human purposeful activity are shared by linguistic activity. Linguistic activity is also considered to have certain neurophysiological correlates and to be related to various levels of consciousness. All activity involves several levels of psychological functioning and is guided by the level that assumes the dominant position. Motives and goals are important elements of activity and thus must be incorporated within a general psycholinguistic theory.

From the foregoing, it follows that an important task for psycholinguistic theory is to explicate what the units of functioning are at each level of language activity. Western psycholinguistic research, especially the Chomskyan school, is criticized for a misguided effort to attempt to impose linguistic units as the units of psycholinguistics as well. In the Soviet view, psycholinguistics ought to be more psychology than linguistics. It is true that Chomsky also some years ago said that linguistics is really one branch of psychology but, then, his way of conceptualizing psychology is quite different from the Soviet view of psychology. Also his view of the functions of language is quite different, since he does not accept the thesis that the main function of language is communication.

In agreement with Miller and his colleagues' early work on the conceptualization of the structure of human behavior, Soviet psycholinguistics assumes that plans (inner programming) play an important part in language production. The plan is coded (and stored for some time) in an inner speech type of code. This, it will be recalled, is basically an abbreviated, "predicative" arrangement of units of sense. (There is a brief reference in Leontev's work that this may be the typical form in which perceived messages are also stored in memory, rather than in their external verbal form.) In the subsequent elaboration of the program, syntagm in its semantic and syntactic aspects plays an important part, and in the motor implementation, finally the word and syllable.

The syntactic aspect of language production is assumed to be constructive, based on rules, and not on Markovian probability chains, whereas the lexical expansion ("filling out") is taken to be influenced by statistical-probabilistic features (as also proposed by Osgood).

Plans are stored only in the short term operative memories, whereas grammatical structures, words, formulaic expressions and sound sequence patterns are part of the permanent memory (also called "mother tongue memory" and "obligatory memory" for the reason that all members of a particular language community simply have to acquire units of this memory in order to be able to become members).

As far as speech production is concerned, a word is not assumed to be stored as an engram. It is not an "object" or "substance", it is a form of semantic, acoustic-articulatory and statistical-probabilistic search of word features. Learning the statistical-probabilistic features of words requires extensive experience with langauge and thus explains why vocabulary learning takes so much longer than learning the syntactical rules. It may also explain why studies on vocabulary teaching, which often neglect the need for repeated exposure over a long period of time, show that vocabulary teaching has no or very little effect on vocabulary growth and on language comprehension.

Better results might be obtained if vocabulary teaching programs were arranged more in line with Leontev's theory of the nature of words in language activity. Extrapolating from this theory, it would be possible to hypothesize that word meanings are learned gradually, i.e., their semantic and probability features are first known tentatively and by repeated exposure these features come to approximate the features possessed by an "expert" member of the language community.

A vocabulary teaching program could be arranged following the general aim of mother tongue instruction as explicated in Leontev's theory. Thus a word is first made the object of conscious analysis. Its sound and syllabic structure is studied. Changes in meaning due to changes in the word "shape" are observed and thus morphological rules are established (~~declension~~ inflection, affixation, compounding, etc.). In addition to this kind of "rule learning", students would encounter a number of words whose meanings are clarified using the morphological rules, definitions, examples of their use in sentences, contextual inference, etc. The words are thus brought to the focus of central awareness. They then appear in spoken and written texts that students meet in school, but they are not singled out for conscious attention. After a relatively short period of time (perhaps 2-4 weeks), they are again made the object of conscious attention and this is again followed by an even longer period (perhaps 1-2 months) when they appear in texts that students read. They are then briefly

reviewed again and then left to "sink" to the level of conscious or unconscious control. Students would periodically be tested on their knowledge of the assigned vocabulary, thus indicating that they themselves are mainly responsible for vocabulary learning.

It would be a relatively easy matter to create a computerized program with 5,000 - 10,000 most common words in school textbooks and let students test their word knowledge, e.g., either by choosing an appropriate alternative or producing a suitable word to fit a context (cloze method), match words and their definitions, or produce words to match definitions, etc. The computer would then produce a list of words that students do not know and need to study further. Work along these lines is in progress at Eastern Illinois College (Taylor, 1983).

This paper will now be concluded with an account of a personal experience.

It was in this "unfashionable" way, decried by many second-language experts, that the present writer taught himself English and Swedish vocabulary while at school. This took place without the benefit of computers, of course, and without any prompting from the teachers. He went through the vocabularies attached to textbooks and short bilingual dictionaries for school use and always ticked off the words that he felt he could not remember. By this decontextualized, list-learning type of memorizing he estimated to have learned some 9,000 - 10,000 words of both English and Swedish during the last three years of school (age 15-18). This is probably a somewhat conservative estimate. This took perhaps something like 700-900 hours of conscious memorizing and self-checking of learning. Thus, some 10-12 words were learned in an hour so permanently that when a Finnish equivalent was given in a word quiz, an English equivalent was in practically 100% of cases produced without any hesitation and without semantic and spelling errors. Accurate and quick access to vocabulary was demonstrated time after time on self-checking and in school quizzes.

It is difficult to estimate exactly the amount of conscious attention given to each word, but in retrospect, it would appear that this kind of automatic access to a relatively large amount of active English vocabulary was obtained through 15-20 reviews spaced over a period of three years.

If the use of word formation rules, the most common ones which were known by the writer, is taken into account, the amount of passive (and also active) vocabulary obviously would be much bigger. With vocabulary of that size, reading English textbooks at college was a relatively easy matter with only an occasional need to check some unfamiliar words in a dictionary.

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